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HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P.O. Box 272400
Mail Stop 35
Fort Collins, Colorado 80527-2400

PATENT APPLICATION

ATTORNEY DOCKET NO. 10002651-1

IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Kurt E. Spears

Serial No.: 09/769,721

Examiner: Aggarwal, Yogesh K

Filing Date: 01/25/2001

Group Art Unit: 2622

Title: PHOTOSENSOR ARRAY USING SEGMENTED CHARGE TRANSFER GATES

COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria VA 22313-1450

BRIEF ON APPEAL

INTRODUCTION

Pursuant to the provisions of 37 CFR Part 41, Subpart B, applicants hereby appeal to the Board of Patent Appeals and Interferences (the "Board") from the examiner's final rejection dated 09/20/2006. A notice of appeal was timely filed on 01/22/2007, in accordance with 37 CFR § 41.31(a)(1).

REAL PARTY IN INTEREST

The entire interest in the present application has been assigned to Hewlett-Packard Development Company, L.P.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

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STATUS OF CLAIMS

Claims 1, 4-6, and 9 are pending in the application.

Claims 2-3 and 7-8 are canceled.

Claims 1, 4-6, and 9 rejected.

Claims 1, 4-6, and 9 are on appeal.

STATUS OF AMENDMENTS

There are no after-final amendments.

SUMMARY OF CLAIMED SUBJECT MATTER

This invention relates generally to photosensor arrays used for optical image scanners and cameras, and more specifically to line arrays commonly used for optical image scanners. A photosensor assembly has charge transfer gates (figures 1A-1C, 104; figure 2, 202 and 208; figures 3A, 3B, 306 and 310; figures 4A, 4B, 402 and 410) that are segmented into multiple sections (A, B, C, D) (page 4, lines 7-11; page 6, line 23 through page 7, line 4; page 8, lines 1-6; page 8, lines 24-28). Individual sections can be controlled. For a small image, only the appropriate sections of the charge transfer gates are used to transfer charges from the photosensors (100, 200, 304, 312, 400) to charge shift registers (102, 204, 210, 308, 404) (for example, see page 4, lines 21-27). The charge shift registers shift the charges toward a node for analog-to-digital conversion (110, 206, 212, 318, 406). When all the charges have been shifted beyond the appropriate sections of the charge transfer gates, the appropriate sections of the charge transfer gates can be activated again (for example, see page 5, lines 1-6). As a result, multiple partial scanlines may be multiplexed onto the charge shift register (for example, see figure 1C and page 5, lines 8-13).

Claim 1 specifies a method of scanning, comprising: exposing, an array of photosensors (for example, figures 1A-1C, 100), to light, a first time; activating a particular section of a charge transfer gate (see for example, page 4, lines 21-25; figures

1A-1C, section D), where the charge transfer gate has a plurality of sections (for example, figures 1A-1C, sections A, B, C, D), each section individually controllable (for example, figures 1A-1C, control lines 106), and fewer than all the sections are activated (in figures 1A-1C, only section D is activated); transferring charges, from a contiguous block of the photosensors, through the particular section of the charge transfer gate, to a charge shift register (for example, figures 1A-1C, 102); exposing, the array of photosensors, to light, a second time (for example, page 5, lines 1-3); transferring charges, from the contiguous block of photosensors, through the particular section of the charge transfer gate, to the charge shift register (for example, page 5, lines 3-7; figure 1C), so that charges from the contiguous block of photosensors, from more than one exposure, are interleaved in the charge shift register (for example, page 5, lines 7-13; figure 1C).

Claim 5 specifies a method of scanning, comprising: exposing, first and second arrays of photosensors to light (for example, figure 3A, 304 and 314); transferring charges, from a first contiguous block of photosensors in the first array of photosensors, to a charge shift register, wherein the block comprises less than all the photosensors, and only charges from the first block are transferred (see, for example, page 8, lines 7-9; figure 3A, section D, and charge shift register 308); transferring charges, from a second contiguous block of photosensors in the second array of photosensors, to the charge shift register, where only the charges from the second block are transferred, so that charges from contiguous blocks from more than one array of photosensors are interleaved in the charge shift register (see, for example page 8, lines 9-13; figure 3B).

Claim 9 specifies a method of scanning, comprising: exposing, first and second arrays of photosensors to light (for example, figure 3A, 304 and 314); transferring charges, from a first block of photosensors in the first array of photosensors, directly to a charge shift register without any intervening charge shift registers, wherein the block comprises less than all the photosensors, and only charges from the first block are transferred (see, for example, page 8, lines 7-9; figure 3A, section D; and charge shift register 308); shifting, in the charge shift register, the charges from the first block of photosensors (see, for example, page 8, lines 7-11; figure 3B); transferring charges, from a second block of photosensors in the second array of photosensors, directly to the charge shift register without any intervening charge shift registers, into the stages of the charge shift register

previously occupied by the charges from the first block of photosensors before shifting, where only the charges from the second block are transferred, so that charges from blocks from more than one array of photosensors are interleaved in the charge shift register (see, for example, page 8, lines 9-13; figure 3B).

GROUND OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether claim 1 (along with its dependent claim 4) is unpatentable under 35 U.S.C. § 102 as anticipated by U.S. Patent Number 6,441,851 (Yonemoto).
2. Whether claim 5 (along with its dependent claim 6) is unpatentable under 35 U.S.C. § 102 as anticipated by U.S. Patent Number 5,345,319 (Yu).
3. Whether claim 9 is unpatentable under 35 U.S.C. § 102 as anticipated by U.S. Patent Number 6,707,498 (Toma et al.).

ARGUMENT

CLAIMS 1 AND 4 IN LIGHT OF GROUNDS OF REJECTION #1

Claim 1 specifies:

activating a particular section of a charge transfer gate, where the charge transfer gate has a plurality of sections, each section individually controllable, and fewer than all the sections are activated;
transferring charges, from a contiguous block of the photosensors, through the particular section of the charge transfer gate, to a charge shift register;

Yonemoto does not teach or suggest transferring charges, from a contiguous block of the photosensors, through a particular section of a charge transfer gate, to a charge shift register. Referring to Yonemoto, figure 2, the examiner cites charges from photosensors 1

and 2 as charges from a contiguous block of photosensors. However, there is no one particular section of a charge transfer gate through which both charges 1 and 2 are transferred. That is, claim 1 specifies that one particular section of the charge transfer gate is activated, and charges from a contiguous block of photosensors are transferred through the one particular section of the charge transfer gate, but in Yonemoto, figure 2, the charges are transferred during two different activations at two different times through two different sections. The set of gates activated for charge 1 (activated by control signal V2a) is not the same set of gates activated for charge 2 (activated by control signal V2b).

CLAIMS 5 AND 6 IN LIGHT OF GROUNDS OF REJECTION #2

Claim 5 specifies interleaving charges from contiguous blocks from more than one array of photosensors on one charge shift register. Yu does not teach or suggest interleaving charges from contiguous blocks from more than one array of photosensors on one charge shift register. In Yu, the structure identified by the single number "1" is two different charge shift registers. From column 1, lines 38-40 (upper and lower HCCD registers 1). Column 3, lines 34-35 refer to a pair of HCCD analog shift registers 10, but reference number 10 does not appear in the figures. In Yu, charges interleaved on any one shift register are not charges from contiguous blocks from more than one array of photosensors. Green is not a contiguous block. Blue and red are not interleaved.

First, the examiner argues that claim 5 does not specify only one charge transfer register. However, the third element of claim 5 specifies transferring charges from a second block to the charge shift register, and further specifies that charges from contiguous blocks from more than one array of photosensors are interleaved in the charge transfer register. The charge transfer register is one charge transfer register, and by the examiner's own characterization, Yu transfers charges to a pair of charge transfer registers.

Second, in Yu, there are no charges from contiguous blocks from more than one array of photosensors interleaved in the charge transfer register. As illustrated in Yu, figure 3, red and green are interleaved, but green charges are not from contiguous blocks of photosensors, and blue and green are interleaved, but green charges are not from contiguous blocks of photosensors. The contiguous blocks are red and blue, and they are

not interleaved. The examiner argues that red and blue are interleaved, but this is merely an unsupported conclusion with no supporting citation to Yu. The examiner states that "it would be obvious to one skilled in the art that they are being simultaneously to the charge shift register." Whatever that may mean, "obvious" is not the standard for anticipation under 35 U.S.C. § 102, and the statement is irrelevant to interleaving.

CLAIM 9 IN LIGHT OF GROUNDS OF REJECTION #3

Claim 9 specifies:

transferring charges, from a first block of photosensors in the first array of photosensors, directly to a charge shift register without any intervening charge shift registers, wherein the block comprises less than all the photosensors, and only charges from the first block are transferred;

transferring charges, from a second block of photosensors in the second array of photosensors, directly to the charge shift register without any intervening charge shift registers, into the stages of the charge shift register previously occupied by the charges from the first block of photosensors before shifting, where only the charges from the second block are transferred, so that charges from blocks from more than one array of photosensors are interleaved in the charge shift register.

Toma et al. do not teach or suggest transferring charges from blocks of photosensors from first and second arrays of photosensors, directly to a charge shift register (where they are later interleaved) without any intervening charge shift registers.

The examiner mischaracterizes Toma et al., and mischaracterizes claim 9. The examiner characterizes Toma et. al., figures 10 and 11, elements 105 and 505 as a first "array" and elements 109 and 509 as a second "array". Toma et al., figure 3, and column 7, lines 14-18, illustrate that photodiodes PD are separate from vertical transfer paths VR. From Toma et al., column 11, lines 1-6, charges are read from photodiodes (not illustrated in figures 10 and 11) to vertical transfer paths VR. From Toma et al., column 11, lines 29-34 and lines 44-49, elements 105 and 505 are charges, shifted from VR1 and VR5 respectively to horizontal transfer register 3. That is, the vertical charge shift registers

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VR1-VR8 are intervening charge shift registers between the photosensors (PD in figure 3) and the charge shift register 3 in which charges are eventually interleaved. In particular, elements 105 and 505 are charges in vertical charge shift registers, not charges in a block of photosensors in an array of photosensors, and the vertical charge shift registers VR1-VR8 are intervening charge shift registers between the photosensors (PD in figure 3) and the charge shift register 3 which eventually contains charges 105, 505, 109, and 509.

The examiner states that the language of claim 9 ("wherein the block comprises less than all the photosensors" is open ended, and therefore may include a combination of photosensors and "vertical CCDs". The examiner is misstating the effect of the word "comprising". The claim specifies a block of photosensors, and the phrase "the block comprises" cannot extend the block of photosensors to things outside the boundaries of whatever is in a block of photosensors. The examiner is interpreting the claim to read: "charges from a block of photosensors and anything else in the world." From MPEP 2111, during patent examination, the pending claims must be given their broadest reasonable interpretation consistent with the specification. The examiner's interpretation is inconsistent with the specification, for example, figures 3A and 3B, and the discussion of figures 3A and 3B in the second paragraph of page 8.

CONCLUSION

In view of the above, applicant respectfully requests that the examiner's rejection of claims 1, 4-6, and 9 be reversed.

Respectfully submitted,



Augustus W. Winfield

Reg. No. 34,046

January 22, 2007

Fort Collins, CO 80528-9599

(970) 898-3142

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CLAIMS APPENDIX

1. A method of scanning, comprising:

exposing, an array of photosensors, to light, a first time;
activating a particular section of a charge transfer gate, where the charge transfer gate has a plurality of sections, each section individually controllable, and fewer than all the sections are activated;
transferring charges, from a contiguous block of the photosensors, through the particular section of the charge transfer gate, to a charge shift register;
exposing, the array of photosensors, to light, a second time;
transferring charges, from the contiguous block of photosensors, through the particular section of the charge transfer gate, to the charge shift register, so that charges from the contiguous block of photosensors, from more than one exposure, are interleaved in the charge shift register.

4. The method of claim 1, further comprising:

shifting charges, within the charge shift register, at a lower than normal shift rate.

5. A method of scanning, comprising:

exposing, first and second arrays of photosensors to light;
transferring charges, from a first contiguous block of photosensors in the first array of photosensors, to a charge shift register, wherein the block comprises less than all the photosensors, and only charges from the first block are transferred;
transferring charges, from a second contiguous block of photosensors in the second array of photosensors, to the charge shift register, where only the charges from the second block are transferred, so that charges from contiguous blocks from more than one array of photosensors are interleaved in the charge shift register.

6. The method of claim 5, further comprising:

shifting charges, within the charge shift register, at a lower than normal shift rate.

9. A method of scanning, comprising:

exposing, first and second arrays of photosensors to light;
transferring charges, from a first block of photosensors in the first array of photosensors, directly to a charge shift register without any intervening charge shift registers, wherein the block comprises less than all the photosensors, and only charges from the first block are transferred;
shifting, in the charge shift register, the charges from the first block of photosensors;
transferring charges, from a second block of photosensors in the second array of photosensors, directly to the charge shift register without any intervening charge shift registers, into the stages of the charge shift register previously occupied by the charges from the first block of photosensors before shifting, where only the charges from the second block are transferred, so that charges from blocks from more than one array of photosensors are interleaved in the charge shift register.

EVIDENCE APPENDIX

Does not apply

RELATED PROCEEDINGS APPENDIX

None